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FLOOD INSURANCE STUDY

ORIGINAL

CITY OF RIO VISTA, CALIFORNIA

SOLANO COUNTY

NOVEMBER 19, 1980
REVISED
AUGUST 4, 1987

Federal Emergency Management Agency

COMMUNITY NUMBER - 060371

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NOTICE TO
FLOOD INSURANCE STUDY USERS

Communities participating in the National Flood Insurance Program have established repositories of flood hazard data for floodplain management and flood insurance purposes. This Flood Insurance Study may not contain all data available within the repository. It is advisable to contact the community repository for any additional data.

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FLOOD INSURANCE STUDY
CITY O RIO VISTA, SOLANO COUNTY, CALIFORNIA

1.0 INTRODUCTION

1.1 Purpose of Study

This Flood Insurance Study investigates the existence and severity of flood hazards in the City of Rio Vista, Solano County, California and aids in the administration of the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973. This study has developed flood risk data for various areas of the community that will be used to establish actuarial flood insurance rates and assist the community in its efforts to promote sound floodplain management. Minimum floodplain management requirements for participation in the National Flood Insurance Program (NFIP) are set forth in the Code of Federal Regulations at 44 CFR, 60.3.

This Flood Insurance Study revises and updates a previous Flood Insurance Study/Flood Insurance Rate Map for the City of Rio Vista. This information will be used by the City of Rio Vista to update existing floodplain regulations as part of the Regular Phase of the NFIP. The information will also be used by local and regional planners to further promote sound land use and floodplain development.

In some states or communities, floodplain management criteria or regulations may exist that are more restrictive or comprehensive than the minimum Federal requirements. In such cases, the more restrictive criteria take precedence; and the State (or other jurisdictional agency) will be able to explain them.

1.2 Authority and Acknowledgments

The sources of authority for this Flood Insurance Study are the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973.

The hydrologic and hydraulic analyses for this study were performed by the U.S. Army Corps of Engineers (COE), Sacramento District, for the Federal Emergency Management Agency (FEMA), under Inter-Agency Agreement No. IAA-H-10-77, Project Order No. 12 and Inter-Agency Agreement No. EMW-E-1153, Project Order No. 1, Amendments No. 22 and 22(a). This study was completed in September 1979 and revised in November 1985.

1.3 Coordination

A precontract, initial coordination meeting, held on September 2, 1976, was attended by representatives of the Federal Insurance Administration, the study contractor, Solano County, and the Cities of Dixon, Rio Vista, and Vacaville. The purpose of this meeting was to discuss flood insurance in general, to present information on study procedures and data requirements, to identify flooding sources to be studied, and to determine study methods.

Intermediate coordination meetings held on November 3, 1978, and January 25, 1979, were attended by representatives of the Federal Insurance Administration, the study contractor, and officials of Solano County. The purpose of these meetings was to review technical data relevant to the study.

Direct contacts were made with the U.S. Geological Survey, California Departments of Finance and Transportation, Solano County, the City of Rio Vista, the local library, newspaper, Chamber of Commerce, and consulting engineering firms.

The results of this study were reviewed at a final community coordination meeting held on June 24, 1980. Attending the meeting were representatives of the Federal Insurance Administration, the study contractor, and the city. No problems were raised at the meeting.

A restudy of flooding on the Sacramento River was initiated as part of a Sacramento-San Joaquin Delta Flood Study performed by the study contractor. For this restudy, an initial coordination meeting was held on July 25, 1983, which was attended by representatives of Solano County, the State of California, FEMA, and the study contractor. Flood insurance in general, and this Flood Insurance Study in particular, were discussed. Information on study procedures and the types of data required to make the study was presented; and the streams and areas to be studied by detailed methods were identified.

In November 1983, a notice of study initiation, which contained a request for pertinent data, was sent to various Federal, State, and local agencies and individuals. An announcement of the intent to perform a flood elevation study in the delta area was published in the local newspaper. Direct contacts for information were made with representatives of the California Department of Water Resources Division, the Solano County Public Works Department, Reclamation Districts, and Architectural-Engineering firms.

Intermediate/final coordination meetings were held on November 7 and 8, 1985. In attendance on the 7th were representatives of FEMA, the State of California, Sacramento and Contra Costa Counties

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and the study contractor. Attending the meeting on the 8th were representatives of FEMA; the State of California; San Joaquin County; the cities of Lodi, Stockton, and Tracy; the study contractor; and various reclamation districts and engineering firms. Technical data relative to this study were reviewed during the two meetings.

2.0 AREA STUDIED

2.1 Scope of Study

This Flood Insurance Study covers the incorporated areas of the City of Rio Vista, Solano County, California. The area of study is shown on the Vicinity Map (Figure 1).

Streams studied by detailed methods were the Sacramento River, and three other streams referred to in this study as Marina Creek, Marina Creek Tributary, and Industrial Creek. Tidal flooding along the Sacramento River at Rio Vista was analyzed by detailed methods.

The areas studied by detailed methods were selected with priority given to all known flood hazard areas and areas of projected development or proposed construction through 1990.

2.2 Community Description

The City of Rio Vista, in southeastern Solano County, is along the west bank of the Sacramento River, on State Highway 12 in west central California. Communities in closest proximity are Isleton, 4 miles to the east, and Walnut Grove, 12 miles to the northeast in Sacramento County. Fairfield and Suisun City in Solano County are approximately 20 miles to the northwest. The cities of Sacramento, which is the state capital, and San Francisco are 30 miles to the northeast
and 48 miles to the southwest, respectively.

Rio Vista originated in 1857 as a small settlement near the junction of Cache Slough and the Sacramento River. Until 1860, it was known as "Brazos del Rio" (Arms of the River). For 5 years it flourished as a shipping point for salmon. In the fall of 1861, prolonged rains fell over the entire Sacramento River basin, and on January 8, 1982, the town was completely washed away by floodwaters. Rio Vista was relocated approximately 3 miles downstream to its present site and developed as an important agricultural center for the area. A variety of vegetables were grown on delta lands to the north. Grains were grown in the Montezuma Hills area to the west. The town was incorporated in 1893. In 1936, natural gas was discovered nearby.

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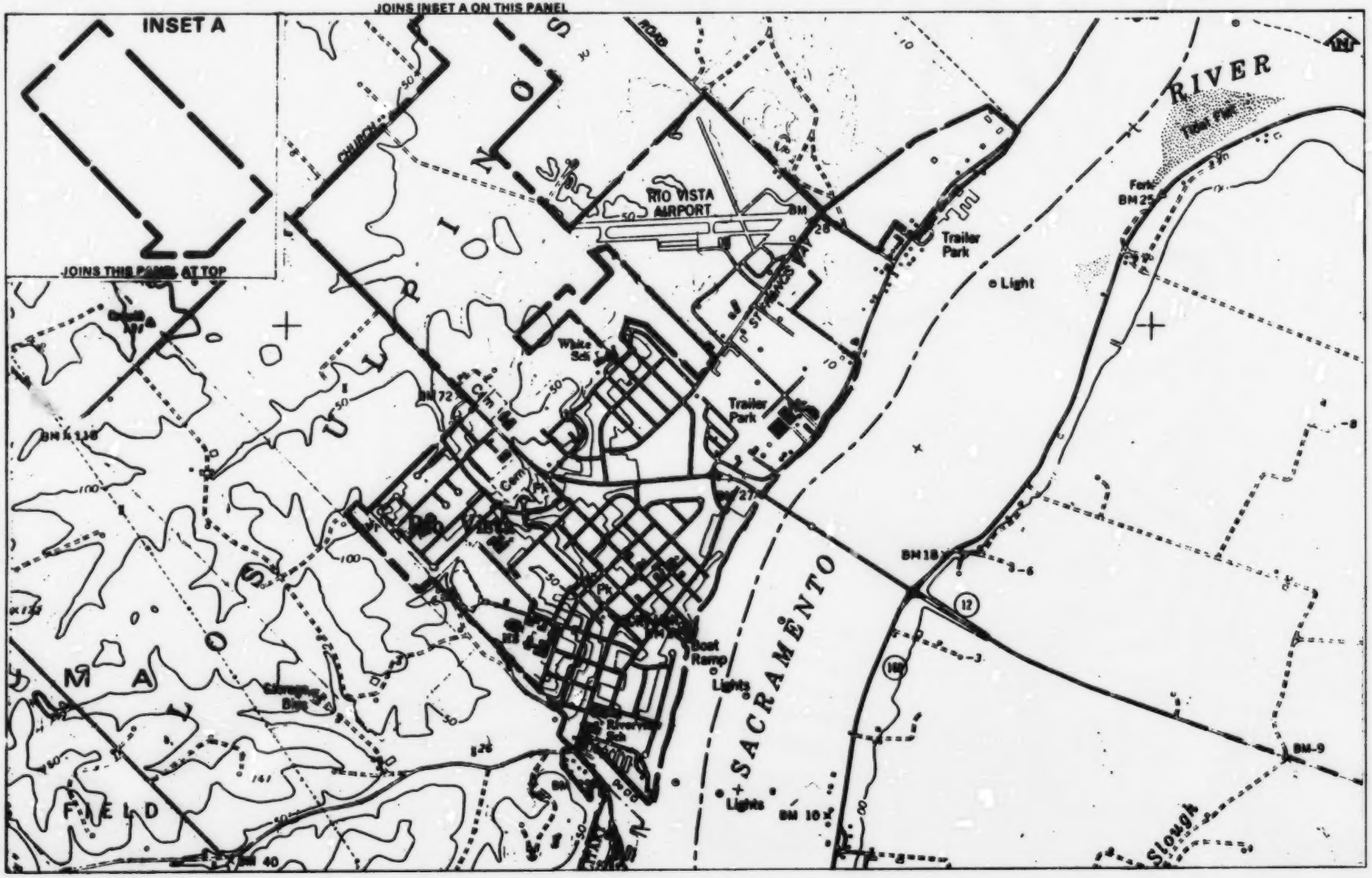

FIGURE 1

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF RIO VISTA, CA.
(SOLANO CO.)

APPROXIMATE SCALE

2000 0 2000 4000 8000 FEET

VICINITY MAP

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Diversified agriculture, the extraction of natural gas, and services associated with both industries continue as significant elements in the economic base of the community. Another important segment of the economy is recreation associated with the delta waterways.

The population of Rio Vista decreased from 3135 in 1970 to 2030 in 1978; a drop of approximately 7 percent. The current population, according to the city, has increased to 3184.

Topography in Rio Vista is characterized by a level to gently sloping valley floor. Elevations range from approximately 5 to 70 feet. The low, rolling Montezuma Hills lie southwest of Rio Vista.

Rio Vista is drained east-southeasterly by Marina Creek, Marina Creek Tributary, and Industrial Creek as they flow toward Sacramento River, which drains the northern half of the Central Valley of California, also called the Delta area. The Sacramento River flowing from the north conveys runoff from approximately twenty one thousand square miles of mountain and foothill tributaries that influence flood conditions in the Delta.

Climate in Rio Vista is characterized by the two well-defined seasons of winter and summer. Winters are mild with frequent rain. Summers are warm to hot with little precipitation. Normal annual precipitation is approximately 17 inches with most of the rain occurring in October through April. Temperatures may reach or exceed 100°F for several consecutive days, but not for extended periods. Nighttime temperatures in summer are usually moderated by cool, moist ocean winds.

Native vegetation has been essentially obliterated by agricultural operations, urbanization, and reclamation.

2.3 Principal Flood Problems

General rain floods can occur in Rio Vista at any time from October through April. This type of flood results from prolonged heavy rainfall and is characterized by high peak flows of moderate duration and large volume runoff. Flooding is more severe when antecedent rain has resulted in saturated ground conditions and minimal infiltration.

Cloudburst storms, sometimes lasting as long as 6 hours, can occur at any time from late spring to early fall, and may occur as an extremely severe sequence within a general rainstorm. Cloudbursts are high intensity storms that can produce floods of high peak flows, short duration floodflows, and a small volume of runoff. In Rio Vista, cloudbursts can produce peak flows substantially greater than those of general precipitation, but they would not affect floodways or flood stages on the Sacramento River.

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The lower reaches of the Sacramento River are under the influence of tides. Severe flooding along this waterway could result when very high tides and a large volume of stream outflow occur coincidentally, and strong onshore winds generate wave action that would increase the flood hazard above that of the tidal surge alone.

The most damaging flood in Rio Vista since 1900 occurred in March 1907. A portion of the town was flooded by high flow in the Sacramento River and concurrent high tides. All the buildings in the Waterfront district were flooded, and Front Street was submerged, except at the high southern end. Flooding also occurred in 1904. Between 1917 and 1927, the river channel downstream from Rio Vista was enlarged and straightened, so water-surface levels have been greatly reduced since that time. Minor flooding occurred along the water-front in December 1955, April 1958, and January 1973. Several buildings were flooded, but no serious damage was reported. Figure 2 shows flooding along the Waterfront in 1955. The most recent severe flooding occurred in February 1986, which caused serious damage to the city.

The tide gaging station at Rio Vista, with a period of record from 1925 to 1986, had a maximum recorded peak stage of 8.8 feet on February 20, 1986.

Recurrence intervals were estimated for tide stages along the Sacramento River. The computed frequency for the 1955 flood was 20 years; for the 1958 flood, 10 years; and for the 1973 flood, 25 years. The February 1986 flood was far in excess of the 100-year flood frequency.

There are no streamflow records for the other streams under study.

2.4 Flood Protection Measures

Rio Vista is bordered by the Sacramento River, the principal river draining the northern half of the Central Valley. Areas adjacent to the river are thus afforded flood protection directly or indirectly by every flood-control storage project in the Sacramento River Basin. These include five major dams and reservoirs on main stem and tributary streams from the Sacramento River in Shasta County on the north to the American River in Sacramento County on the south. Other major storage projects in the basin are authorized but have not been started.

The Sacramento River Flood Control Project consists of a comprehensive system of levees, overflow weirs, pumping plants, bypass channels, and channel enlargement along the river from its mouth upstream to Chico Landing (Butte County); levees along the lower reaches of its primary and secondary tributaries; and levees along certain major delta sloughs. A basic operational function of the project is the transfer of excess floodwater to leveed bypasses. Operation and maintenance of the project works are responsibilities of varied local interests.

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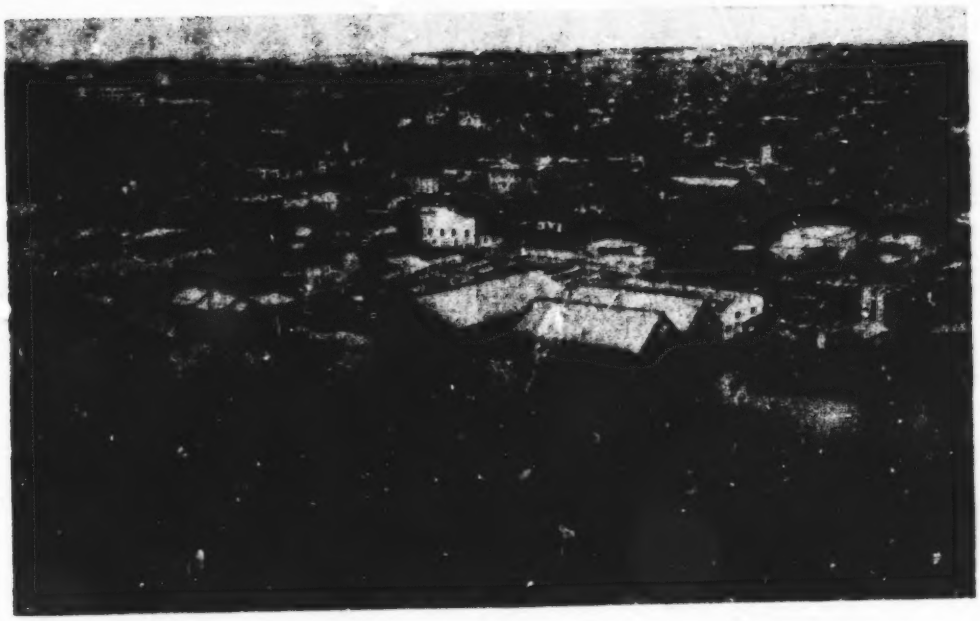

Figure 2. Flooding Along the Waterfront in Rio Vista, December 27, 1955 (Sacramento Bee Photo)

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The Rio Vista zoning ordinance provides for floodway districts and prescribes use and development of land therein, and for regulating use of other floodplain areas. A floodway has been designated along the lower 0.75 mile of Industrial Creek.

3.0 ENGINEERING METHODS

For the flooding sources studied in detail in the community, standard hydrologic and hydraulic study methods were used to determine the flood hazard data required for this study. Flood events of a magnitude which are expected to be equaled or exceeded once on the average during any 10-, 50-, 100-, or 500-year period (recurrence interval) have been selected as having special significance for floodplain management and for flood insurance rates. These events, commonly termed the 10-, 50-, 100-, and 500-year floods, have a 10, 2, 1 and 0.2 percent chance, respectively, of being equaled or exceeded during any year. Although the recurrence interval represents the long term average period between floods of a specific magnitude, rare floods could occur at short intervals or even within the same year. The risk of experiencing a rare flood increases when periods greater than 1 year are considered. For example, the risk of having a flood which equals or exceeds the 100-year flood (1 percent chance of annual exceedence) in any 50-year period is approximately 40 percent (4 in 10), and for any 90-year period, the risk increases to approximately 60 percent (6 in 10). The analyses reported herein reflect flooding potentials based on conditions existing in the community at the time of completion of this study. Maps and flood elevations will be amended periodically to reflect future changes.

3.1 Hydrologic Analyses

Hydrologic analyses were carried out to establish peak discharge-frequency relationships for each flooding source studied in detail affecting the community.

Procedures used included the C.O.E. Standard Project rainfall and flood concept and the unit hydrograph method of analysis. A Standard Project Flood would result from the most severe combination of meteorologic and hydrologic conditions considered reasonably characteristic of the geographic area in which the drainage basin is located, excluding extremely rare combinations. Both the 96-hour general rain and the 3-hour local Standard Project storms were evaluated. Precipitation amounts and distribution were computed using the C.O.E. methodology (Reference 1). Loss rates were based on the initial and constant loss concept. The unit hydrograph-excess rainfall method was used to compute flood hydrographs. Unit hydrographs were synthetically derived, because there were no streamflow records available for the streams under study.

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For streams in Rio Vista (excluding the Sacramento River), rainfall amounts for computation of cloudburst floods other than the Standard Project Flood were computed from a precipitation-frequency analysis of the Sacramento City Weather Service Office precipitation station (period of record, 128 years).

Ratios (of the computed Standard Project Flood) developed from peak flow-frequency curves for regional streams were used to compute the 10-, 50-, 100-, and 500-year general rain floods.

Peak discharge-drainage area relationships for Marina Creek, Marina Creek Tributary, and Industrial Creek are shown in Table 1.

TABLE 1. SUMMARY OF DISCHARGES

Flooding Source and Location	Drainage Area (square miles)	Peak Discharge (cubic feet per second) 10-Year	50-Year	100-Year	500-Year
Marina Creek					
At Second Street	1.8	200	510	730	1500
Above Marina Creek Tributary	1.6	175	450	645	1330
Marina Creek Tributary					
Above Mouth	0.2	25	60	85	170
Industrial Creek					
At St. Francis Way	1.4	135	325	455	940

Tidal action, tributary basin runoff, and meteorologic conditions (barometric pressure, wind direction, and velocity) are the major factors influencing water-surface elevations associated with the Sacramento River.

Frequency analyses of water-surface elevations in the Sacramento River were performed using an analytical study of higher high stage-frequency relationships from 24 gaging stations located throughout the delta area (Reference 2). The selected period of record for the analyses (1945 to 1974) is subsequent to construction of Shasta Dam on the Sacramento River and covers the maximum length of record for the majority of the gages. Also, the Delta hydraulic pattern has not changed significantly during that period. For continuity among the gages used in this study, all gage data were adjusted to a datum of zero elevation, National Geodetic Vertical Datum of 1929 (NGVD).

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Originally, the stage data were statistically analyzed using the Pearson Type III distribution method included in U.S. Water Resources Council guidelines (Reference 3). The resultant curves did not reflect either levee overtopping or levee breaks resulting in extensive areal inundation. Therefore, the shape of the curves was graphically developed to include those conditions. The stage-frequency relationship for each gage was compared with the stage-frequency relationships developed for adjacent gages and, if necessary, adjusted to obtain consistency.

Flood elevations on watercourses in the Sacramento-San Joaquin Delta area were determined using a tidal hydrodynamics computer model. Based on a network of nodes and a grid of channels connecting the nodes, the model solves two basic equations of one-dimensional dynamic fluid flow. The first is the equation of continuity; the second is the equation of motion. Through numerical integration of these equations using the modified Runge-Kutta or modified Euler methods, the model computes water surface elevations.

The Sacramento-San Joaquin Delta to the Golden Gate is represented on two grid systems. The coarse grid contains some 250 nodes connected by 325 channels; the fine grid contains 1,200 nodes and 1,800 channels. In addition to physical parameters of the individual channels, the model uses inflow, outflow, evaporation losses, tidal elevations and wind velocity to solve for water surface elevations. It must be noted that wave action at Rio Vista will increase the 100-year flood stage by 1.5 to 2.0 feet.

Elevations for floods of the selected recurrence intervals on the Sacramento River at the tide gage located in the south of Rio Vista are shown in Table 2.

TABLE 2. SUMMARY OF ELEVATIONS

Flooding Source and Location	Elevation (feet) 10-Year	50-Year	100-Year	500-Year
Sacramento River				
Rio Vista Tide Gage	6.4	7.0	7.2	8.0

Unexpected findings were not encountered in carrying out the hydrologic analyses for this Flood Insurance Study.

3.2 Hydraulic Analyses

Analyses of the hydraulic characteristics of flooding from the sources studied were carried out to provide estimates of the elevations of floods of the selected recurrence intervals along each flooding source studied in detail. Flood elevations were

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computed through the use of THE C.O.E. HEC-2 step-backwater computer program (Reference 4). The methodology used to determine flood elevations on the Sacramento River is described in Section 3.1 above.

Cross sections for backwater analysis were located at close intervals upstream and downstream from bridges and culverts and other hydraulically significant features in order to establish the backwater effect of such structures in areas presently urbanized or subject to development. Cross sections were either field surveyed or taken from available construction plans.

All bridges, dams, weirs, drop structures, and culverts were field checked to obtain elevation and size of openings, and other structural data.

Locations of selected cross sections used in the hydraulic analyses are shown on the Flood Profiles (Exhibit 1). For stream segments for which a floodway is computed (Section 4.2), selected cross section locations are also shown in the Flood Insurance Rate Map Exhibit 2).

Roughness factors (Manning's "n") for hydraulic computations were assigned on the basis of field inspection of floodplain areas. The factors ranged from 0.030 to 0.080 for channels and 0.030 to 0.100 for overbank areas.

Starting water-surface elevations for Marina Creek and Industrial Creek were taken to be the corresponding elevations along Sacramento River at their respective confluences. Starting water-surface elevations for Marina Creek Tributary were taken to be the corresponding elevations along Marina Creek at their confluence. These starting elevations are the result of determining that peak flows occur coincidentally.

Results of the hydraulic analysis showed that flooding along Marina Creek Tributary, within the study area and along Industrial Creek above St. Francis Way, takes the form of sheet flow. In sheet flow areas, depths of flooding are determined and no profiles are drawn.

The hydraulic analyses for this study were based on unobstructed flow. The flood elevations shown on the profiles are thus considered valid only if hydraulic structures remain unobstructed, operate properly, and do not fail.

All elevations are referenced to the NGVD of 1929. Elevation reference marks used in this study are shown on the maps; the description of the marks are presented in Elevation Reference Marks (Exhibit 3).

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4.0 FLOODPLAIN MANAGEMENT APPLICATIONS

The NFIP encourages state and local governments to adopt sound floodplain management programs. Therefore, each Flood Insurance Study provides 100-year flood elevations and delineations of the 100- and 500-year floodplain boundaries and 100-year floodway to assist communities in developing floodplain management measures.

4.1 Floodplain Boundaries

To provide a national standard without regional discrimination, the 1 percent annual chance (100-year) flood has been adopted by FEMA as the base flood for floodplain management purposes. The 0.2 percent annual chance (500-year) flood is employed to indicate additional areas of flood risk in the community. For each stream studied in detail, the 100- and 500-year floodplain boundaries have been delineated using the flood elevations determined at each cross section. Between cross sections, the boundaries were interpolated using topographic maps at a scale of 1:24,000, with a contour interval of 10 feet (Reference 5).

Flood boundaries for the Sacramento River were delineated on the basis of flood elevations established from stage-frequency curves using aerial photomaps (Reference 6) and topographic maps at a scale of 1:1,200 with a contour interval 2 feet (Reference 7). Flood boundaries for these areas reflect the effects of wind setup, but not wave action. Wave action is specifically excluded from data developed for this study.

Areas of shallow flooding were delineated using the topographic maps at a scale of 1:24,000, with a contour interval at 10 feet (Reference 5).

The 100- and 500-year floodplain boundaries are shown on the Flood Insurance Rate Map (Exhibit 2). On this map, the 100-year floodplain boundary corresponds to the boundary of the areas of special flood hazards (Zones AE and AO); and the 500-year floodplain boundary corresponds to the boundary of areas of moderate flood hazards. In cases where the 100- and 500-year floodplain boundaries are close together, only the 100-year floodplain boundary has been shown. Small areas within the floodplain boundaries may lie above the flood elevations but cannot be shown due to limitations of the map scale and/or lack of detailed topographic data.

4.2 Floodways

Encroachment on floodplains, such as structures and fill, reduces flood-carrying capacity, increases flood heights and velocities, and increases flood hazards in areas beyond the encroachment itself. One aspect of floodplain management involves balancing the

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economic gain from floodplain development against the resulting increase in flood hazard. For purposes of the NFIP, a floodway is used as a tool to assist local communities in this aspect of floodplain management. Under this concept, the area of the 100-year floodplain is divided into a floodway and a floodway fringe. The floodway is the channel of a stream, plus any adjacent floodplain areas, that must be kept free of encroachment so that the 100-year flood can be carried without substantial increases in flood heights. Minimum Federal standards limit such increases to 1.0 foot, provided that hazardous velocities are not produced. The floodways in this study are presented to local agencies as minimum standards that can be adopted directly or that can be used as a basis for additional floodway studies.

The floodways presented in this study were computed for certain stream segments on the basis of equal conveyance reduction from each side of the floodplain. Floodway widths were computed at cross sections. Between cross sections, the floodway boundaries were interpolated. The results of the floodway computations are tabulated at selected cross sections (Table 3). In cases where the floodway and 100-year floodplain boundaries are either close together or collinear, only the floodway boundary has been shown.

The area between the floodway and 100-year floodplain boundaries is termed the floodway fringe. The floodway fringe encompasses the portion of the floodplain that could be completely obstructed without increasing the water-surface elevation of the 100-year flood more than 1.0 foot at any point. Typical relationships between the floodway and the floodway fringe and their significance to floodplain development are shown in Figure 3.

5.0 INSURANCE APPLICATION

For flood insurance rating purposes, flood insurance zone designations are assigned to a community based on the results of the engineering analyses. These zones are as follows:

Zone AE

Zone AE is the flood insurance rate zone that corresponds to the 100-year floodplains that are determined in the Flood Insurance Study by detailed methods. Whole-foot base flood elevations derived from the detailed hydraulic analyses are shown at selected intervals within this zone.

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FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH[2] (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE[3]
					(FEET NGVD)			
Industrial Creek								
A	400	27	102	4.5	8.9	8.9	9.4	0.5
B	660	27	63	7.2	9.3	9.3	9.7	0.4
C	1160	55	130	3.0	10.8	10.8	11.3	0.5
D	1860	100	102	4.5	13.2	13.2	13.2	0.0
Marina Creek								
A	1305	85	111	6.6	8.6	8.6	8.9	0.3
B	1355	66	282	2.6	9.1	9.1	9.6	0.5

[1] Feet Above Confluence With Sacramento River

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TABLE 3

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF RIO VISTA, CA
(SOLANO CO.)

FLOODWAY DATA

INDUSTRIAL CREEK - MARINA CREEK

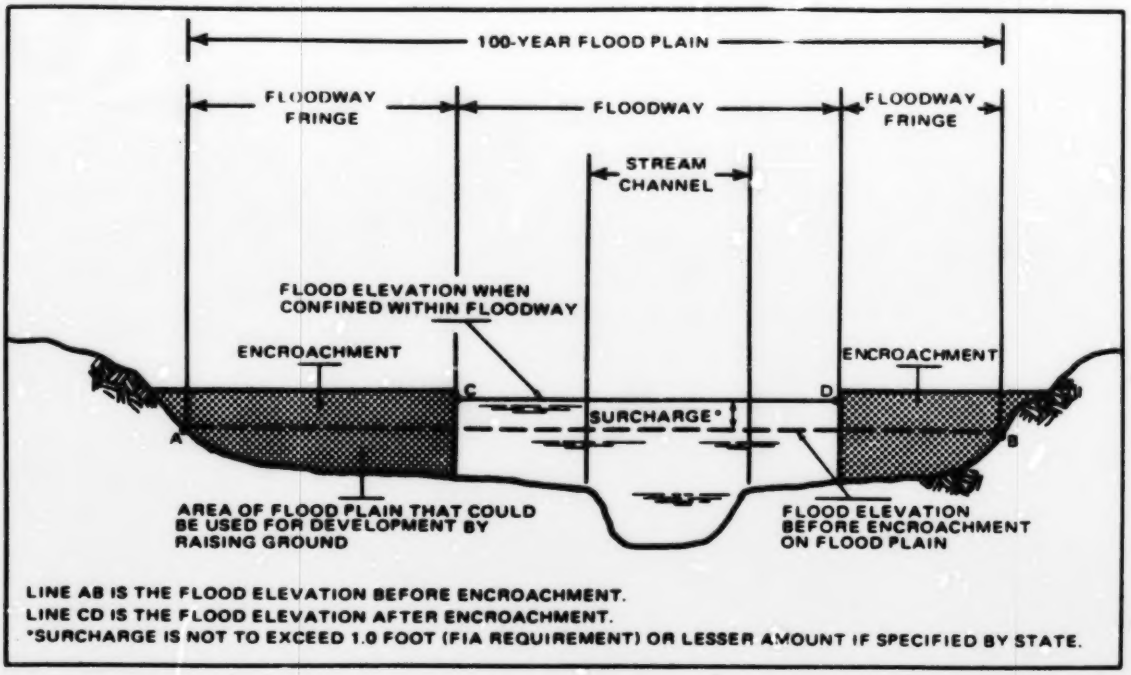
100-YEAR FLOOD PLAIN
FLOODWAY FRINGE
FLOODWAY
FLOODWAY FRINGE
STREAM CHANNEL
FLOOD ELEVATION WHEN CONFINED WITHIN FLOODWAY
ENCROACHMENT
ENCROACHMENT
C
D
SURCHARGE*
A
B
AREA OF FLOOD PLAIN THAT COULD BE USED FOR DEVELOPMENT BY RAISING GROUND
FLOOD ELEVATION BEFORE ENCROACHMENT ON FLOOD PLAIN
LINE AB IS THE FLOOD ELEVATION BEFORE ENCROACHMENT.
LINE CD IS THE FLOOD ELEVATION AFTER ENCROACHMENT.
*SURCHARGE IS NOT TO EXCEED 1.0 FOOT (FIA REQUIREMENT) OR LESSER AMOUNT IF SPECIFIED BY STATE.

Figure 3. Floodway Schematic

Zone AO

Zone AO is the flood insurance rate zone that corresponds to the areas of 100-year shallow flooding (usually sheet flow on sloping terrain) where average depths are between 1 and 3 feet. Average whole-foot depths derived from the detailed hydraulic analyses are shown within this zone.

Zone X

Zone X is the flood insurance rate zone that corresponds to areas outside the 500-year floodplain, areas within the 500-year floodplain, areas of 100-year flooding where average depths are less than 1 foot, areas of 100-year flooding where the contributing drainage area is less than 1 square mile, and areas protected from the 100-year flood by levees. No base flood elevations or depths are shown within this zone.

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6.0 FLOOD INSURANCE RATE MAP

The Flood Insurance Rate Map is designed for flood insurance and floodplain management applications.

For flood insurance applications, the map designates flood insurance rate zones as described in Section 5.0 and, in the 100-year floodplains that were studied by detailed methods, shows selected whole-foot base flood elevations or average depths. Insurance agents use the zones and base flood elevations in conjunction with information on structures and their contents to assign premium rates for flood insurance policies.

For floodplain management applications, the map shows by tints, screens, and symbols, the 100- and 500-year floodplains, the floodways, and the locations of selected cross sections used in the hydraulic analyses and floodway computations.

7.0 OTHER STUDIES

The Federal Insurance Administration has published a Flood Hazard Boundary Map dated October 1975 (Reference 8). Due to the more detailed methods used in this Flood Insurance Study, it supersedes the previous Flood Hazard Boundary Map.

The Federal Insurance Administration is preparing revisions of the Flood Insurance Studies for unincorporated areas of Solano County (Reference 9) and Sacramento County (Reference 10). The county studies will be in complete agreement with this Flood Insurance Study.

This study is authoritative for the purposes of the NFIP; data presented herein either superesede or are compatible with all previous determinations.

8.0 LOCATION OF DATA

Information concerning the pertinent data used in the preparation of this study can be obtained by contacting the Natural and Technological Hazards Division, FEMA, Presidio of San Francisco, Building 105, San Francisco, California 94129.

9.0 BIBLIOGRAPHY AND REFERENCES

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6. Towill, Inc., Aerial Photomaps, Scale 1:1,200, April 7, 1981.

7. City of Rio Vista, Topographic Maps, Surveyed in January 1951 by C.C. Greenwood Jr., Civil Engineer, R.E. No. 7583, Scale 1:1,200, with Contour Interval 2 feet .

8. U.S. Department of Housing and Urban Development, Federal Insurance Administration, Flood Hazard Boundary Map, City of Rio Vista, California, Scale 1:9,000 (October 1975).

9. Federal Emergency Management Agency, Federal Insurance Administration, Flood Insurance Study, Solano County, California (Unincorporated Areas), unpublished.

10. Federal Emergency Management Agency, Federal Insurance Administration, Flood Insurance Study, Sacramento County, California (Unincorporated Areas), unpublished.

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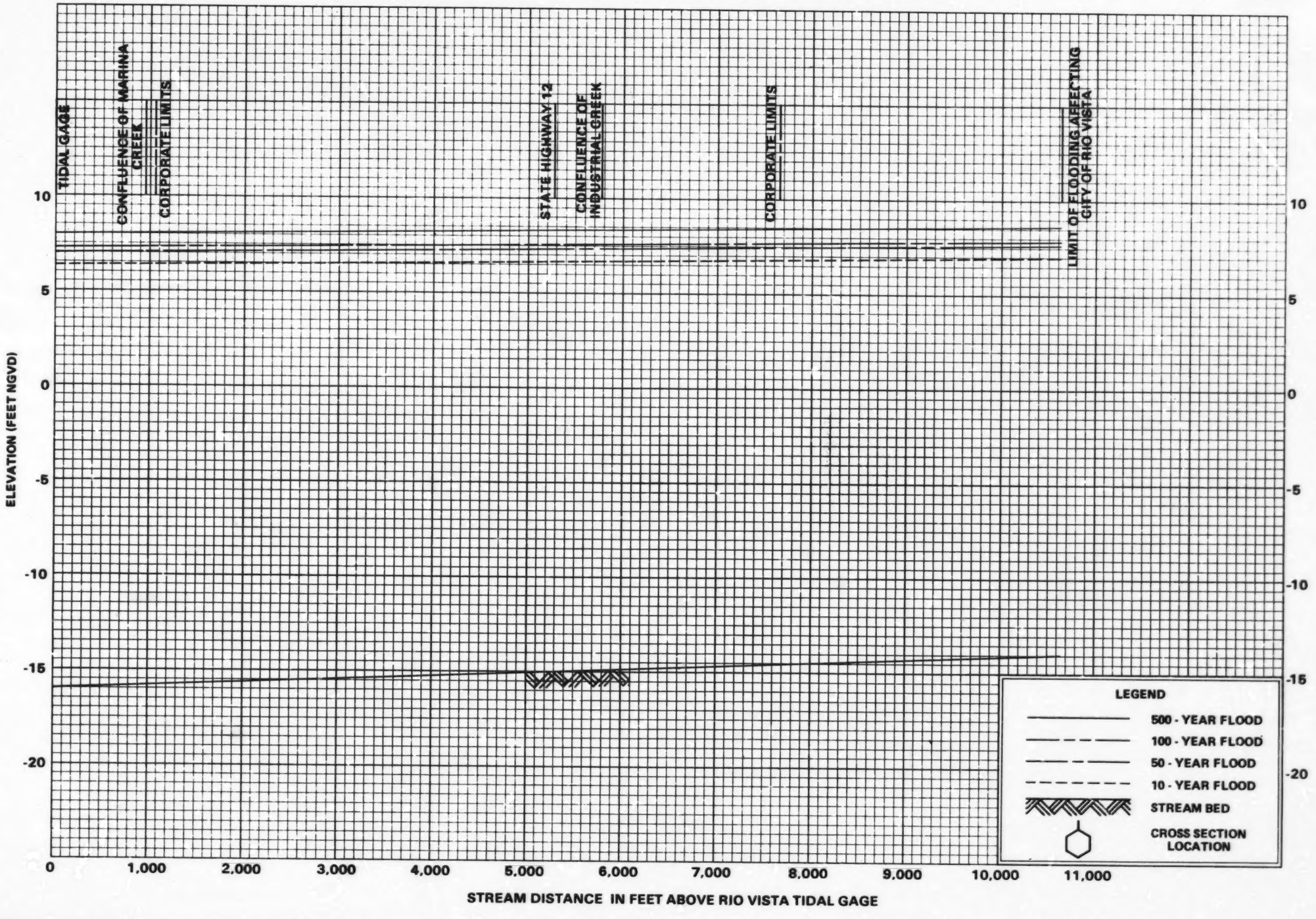

FLOOD PROFILES

SACRAMENTO RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF RIO VISTA, CA
(SOLANO CO.)

01P

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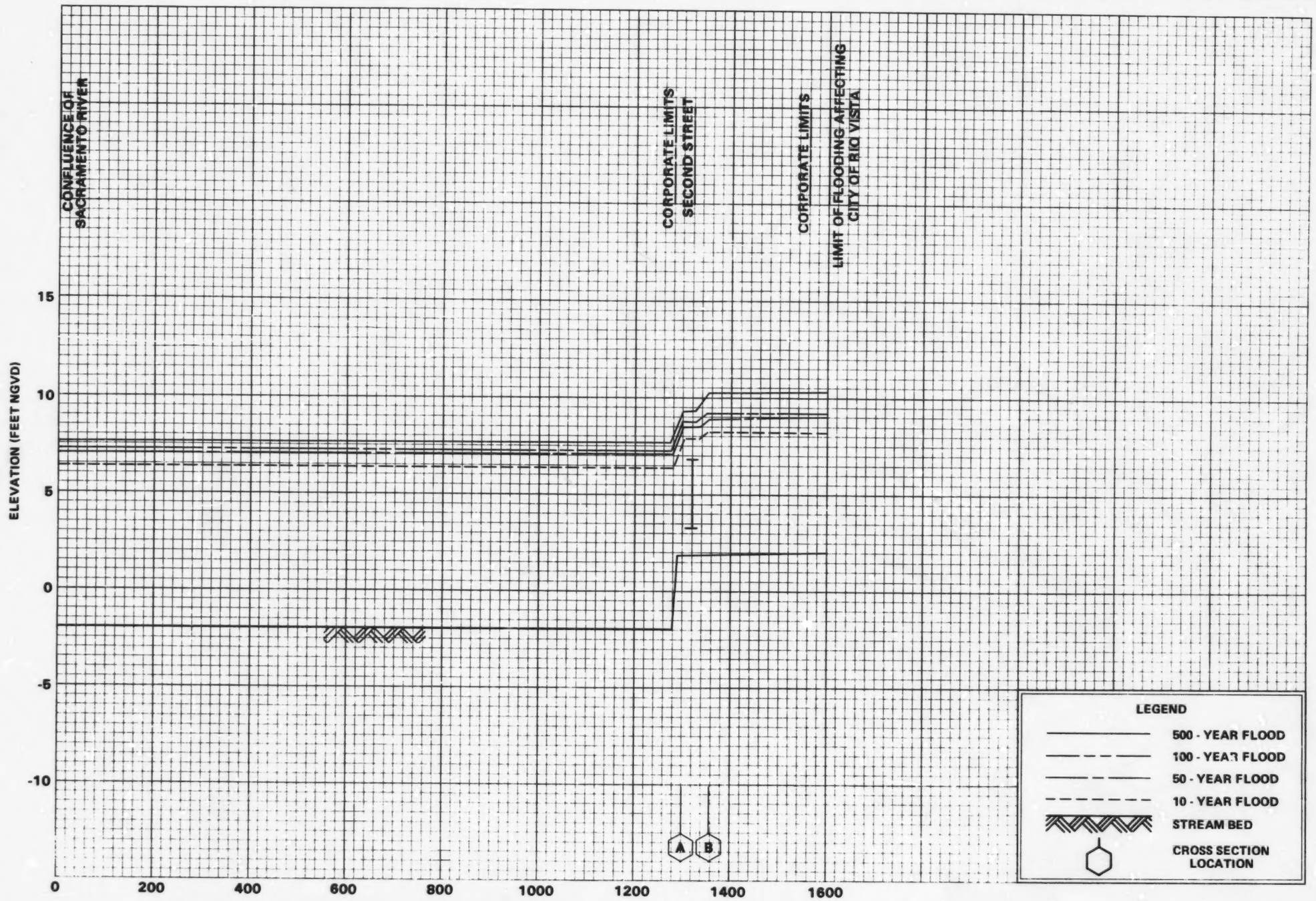

FLOOD PROFILES

MARINA CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF RIO VISTA, CA
(SOLANO CO.)

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ELEVATION (FEET NGVD)

CORPORATE LIMITS

CONFLUENCE OF SACRAMENTO RIVER

RIVER ROAD

15
10
5
0
-5

A
B
C
D

0 200 400 600 800 1000 1200 1400 1600 1800 2000

STREAM DISTANCE IN FEET ABOVE CONFLUENCE WITH SACRAMENTO RIVER

LEGEND

- 500 - YEAR FLOOD
- 100 - YEAR FLOOD
- 50 - YEAR FLOOD
- 10 - YEAR FLOOD
- STREAM BED
- CROSS SECTION LOCATION

FLOOD PROFILES

INDUSTRIAL CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF RIO VISTA, CA
(SOLANO CO.)

03P

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EXHIBIT 3 - ELEVATION REFERENCE MARKS
CITY OF RIO VISTA, SOLANO COUNTY, CALIFORNIA

Reference Mark	Elevation (feet NGVD)	Description of Location
RM 1	28.18	U.S. Geological Survey bench mark (Pier 6), in concrete post, 10 feet above and southwest of a county road, 0.1 mile southeast from intersection of Montezuma Hills Road and Second Street.
RM 2*	8.90	U.S. Army Corps of Engineers temporary bench mark, located in top of manhole cover at intersection of River and Airport Roads, 0.7 mile northeast of State Highway 12. Bench mark "V 190" (RM3) was used to established elevation.
RM 3	27.48	California Division of Highways bench mark (V 190) in south concrete sidewalk, 40 feet west of west end of State Highway 12 bridge over the Sacramento River.

* Outside Corporate Limits

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